CTEH® CENTER FOR TOXICOLOGY AND ENVIRONMENTAL HEALTH, LLC

Mission Incident
Santa Paula, CA
Preliminary Summary of Air Monitoring Results
December 04, 2014

Prepared by
Center for Toxicology and Environmental Health, L.L.C. (CTEH®)
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CTEH® CENTER FOR TOXICOLOGY AND ENVIRONMENTAL HEALTH, LLC

Introduction

Center for Toxicology and Environmental Health, LLC (CTEH®) continued air monitoring in support of response activities following a vac truck explosion and fire in Santa Paula, CA.

This submittal summarizes air monitoring data for December 04, 2014 07:00 to December 05, 2014 07:00.

Real-time Air Monitoring

All instrumentation was calibrated at least once per day or per manufacturer's recommendations. Manually-logged real-time air monitoring was conducted for chlorine (Cl_2), hydrogen sulfide (H_2S), percent of the Lower Explosive Limit (LEL), oxygen (O_2), peroxides, particulate matter (10 micron particles, PM_{10}), sulfur dioxide (SO_2), sulfuric acid (H_2SO_4), and volatile organic compounds (VOCs), with instruments such as Gastec® pumps with chemical-specific colorimetric tubes, RAESystems® MultiRAE Plus and MultiRAE Pro PID with chemical-specific sensors, and TSI® AM510s for particulate matter. Monitoring was conducted by CTEH® personnel in the work area, at fixed locations in the surrounding community, and along the perimeter of the facility in the community. Table 1 summarizes monitoring data for manually-logged real-time readings. Maps including the site location, fixed community real-time air monitoring locations, aerial site photo, and roaming monitoring are included in Appendix A.

CTEH® monitored RAESystems© AreaRAE units with ProRAE Guardian system at four locations on the fence line of the facility within the work area and an additional three units throughout the day by frac tanks near the designated decon areas. AreaRAEs were equipped with sensors to detect VOCs, LEL, H_2S, and SO_2. Table 2 summarizes monitoring data for AreaRAE monitoring. AreaRAE graphs displaying real-time air monitoring data as well as 15-minute rolling averages and a map depicting AreaRAE locations are included in Appendix B.

Particulate monitors were data-logged along the facility perimeter collocated with AreaRAE stations 1, 2, 3, and 4. Table 3 summarizes data-logged PM_{10} data from these units.

Table 1: Manually-Logged Real-Time Air Monitoring Summary[1]
December 04, 2014 07:00 – December 05, 2014 07:00

Location Category	Analyte	Instrument	No. of Readings	No. of Detections	Avg. of Detections	Concentration Range
Community	Cl_2	MR+ / MR Pro	22	0	NA	<0.1 ppm
	LEL	MR+ / MR Pro	21	0	NA	<1 %
	O_2	MR+ / MR Pro	22	22	20.9	20.9 - 21 %
	Peroxides	Gastec 32	22	0	NA	<0.1 ppm
	PM_{10}	AM510/Dusttrak	22	22	0.0204	0.01 - 0.034 mg/m^3
	SO2	MR+ / MR Pro	23	0	NA	<0.1 ppm
	H_2SO_4	Gastec 35	22	0	NA	<0.2 mg/m^3
	VOC	MR+ / MR Pro	22	0	NA	<0.1 ppm
Exclusion Zone	Cl_2	Gastec 8La	2	0	NA	<0.05 ppm
	H_2S	MR+ / MR Pro	9	0	NA	<0.1 ppm
	HCl	Gastec 14L	2	0	NA	<0.05 ppm
	LEL	MR+ / MR Pro	8	0	NA	<1 %
	O_2	MR+ / MR Pro	3	3	20.9	20.9 - 20.9 %
	Peroxides	Gastec 32	1	0	NA	<0.1 ppm
	PM_{10}	AM510/Dusttrak	3	3	0.1	0.007 - 0.286 mg/m^3
	SO_2	MR+ / MR Pro	8	0	NA	<0.1 ppm
	H_2SO_4	Gastec 35	2	0	NA	<0.2 mg/m^3
	VOC	MR+ / MR Pro	10	3	0.2	0.1 - 0.4 ppm
Work Area	Cl_2	Gastec 8La	5	0	NA	<0.05 ppm
	H_2S	Gastec 4LL	3	0	NA	<0.1 ppm
		MR+ / MR Pro	22	0	NA	<0.1 ppm
	LEL	MR+ / MR Pro	22	0	NA	<1 %
	Peroxides	Gastec 32	4	0	NA	<0.1 ppm
	SO_2	Gastec 5Lb	1	0	NA	<0.1 ppm
		MR+ / MR Pro	22	0	NA	<0.1 ppm
	H_2SO_4	Gastec 35	3	0	NA	<0.2 mg/m^3
	VOC	MR+ / MR Pro	22	0	NA	<0.1 ppm

[1]*Note: The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format.*
[2]*Maximum detections preceded by the "<" symbol are considered non-detects below reporting limit to the right.*

Table 2: AreaRAE Air Monitoring Summary[1]
December 04, 2014, 2014 07:00 – December 05, 2014 07:00

Unit ID	Analyte	No. of Readings	No. of Detections	Avg. of Detections	Detection Range
Unit 01	H_2S	5369	625	0.1 ppm	0.1 - 0.3 ppm
	LEL	5369	0	NA	< 1 %
	SO_2	5369	4	0.1 ppm	0.1 - 0.1 ppm
	VOC	5369	7	0.1 ppm	0.1 - 0.1 ppm
Unit 02	H_2S	5301	7	0.2 ppm	0.1 - 0.4 ppm
	LEL	5301	0	NA	< 1 %
	SO_2	5301	0	NA	< 0.1 ppm
	VOC	5301	9	0.1 ppm	0.1 - 0.1 ppm
Unit 03	H_2S	5472	445	0.1 ppm	0.1 - 0.2 ppm
	LEL	5472	0	NA	< 1 %
	SO_2	5472	2	0.1 ppm	0.1 - 0.1 ppm
	VOC	5472	14	0.1 ppm	0.1 - 0.4 ppm
Unit 04	H_2S	4936	130	0.1 ppm	0.1 - 0.1 ppm
	LEL	4936	0	NA	< 1 %
	SO_2	4936	0	NA	< 0.1 ppm
	VOC	4936	0	NA	< 0.1 ppm
Unit 05	H_2S	391	1	0.5 ppm	0.5 - 0.5 ppm
	LEL	400	0	NA	< 1 %
	SO_2	391	2	0.1 ppm	0.1 - 0.1 ppm
	VOC	400	0	NA	< 0.1 ppm
Unit 06	H_2S	1539	402	0.2 ppm	0.1 - 0.5 ppm
	LEL	1539	0	NA	< 1 %
	SO_2	1539	0	NA	< 0.1 ppm
	VOC	1539	102	0.1 ppm	0.1 - 0.1 ppm
Unit 07	H_2S	742	0	NA	< 1 ppm
	LEL	742	0	NA	< 1 %
	SO_2	742	0	NA	< 0.1 ppm
	VOC	742	471	0.3 ppm	0.1 - 0.5 ppm

[1]*Note: The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format.*
[2]*Maximum detections preceded by the "<" symbol are considered non-detects below reporting limit to the right.*

Table 3: AM510 PM_{10} Monitoring Summary[1]
December 04, 2014, 2014 07:00 – December 05, 2014 07:00

Serial No.	Location	No. of Readings	No. of Detections	Avg. Detection	Detection Range
10704067	AR01	4625	4625	0.012	0.004 - 0.07 mg/m^3
10601072	AR02	2885	2885	0.011	0.004 - 0.166 mg/m^3
10704072	AR03	4667	4667	0.011	0.004 - 0.162 mg/m^3
10704074	AR04	3749	3749	0.009	0.004 - 0.073 mg/m^3

Appendix A

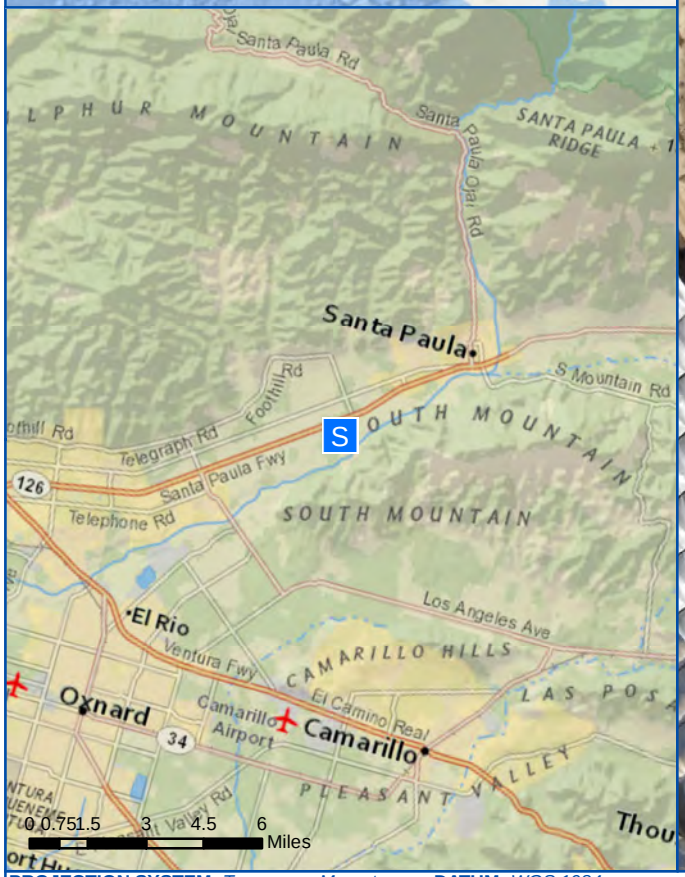
Incident Maps:

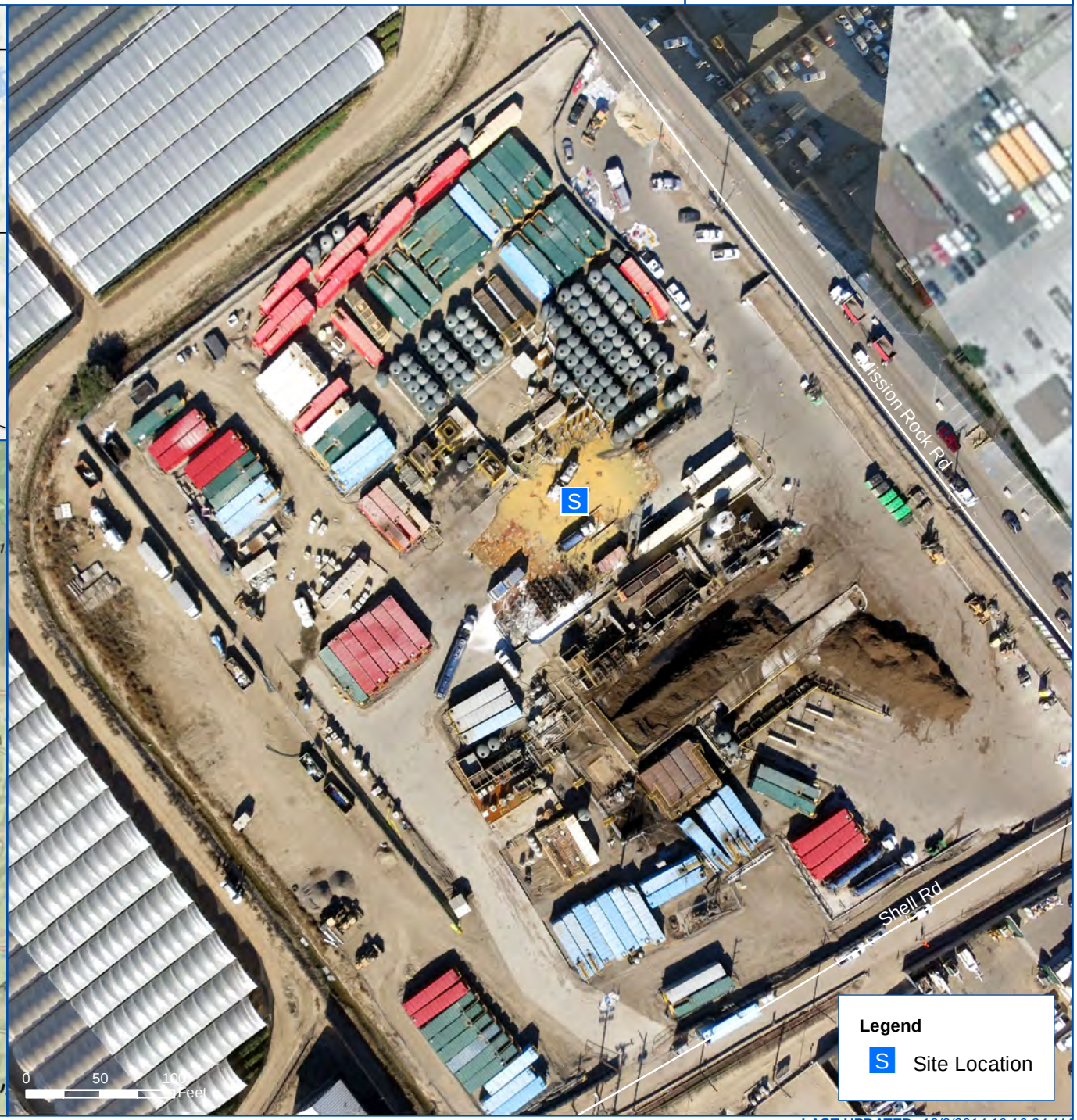
Real-time Air Monitoring Locations and Incident Site

Site Location

Mission Incident

Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura





PROJECTION SYSTEM: *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *12/2/2014 10:10:34 AM*

Aerial Overview - 12/04/2014

Mission Incident

Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *12/5/2014 5:02:17 PM*

Fixed Community Real-Time Air Monitoring Station Locations

Mission Incident

Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *11/25/2014 12:22:02 PM*

Manually Logged Real-Time Air Monitoring Concentrations

VOC - Dec 04, 2014 07:00 to Dec 05, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84*

Print Date: *12/5/2014 10:55:13 AM*

Manually Logged Real-Time Air Monitoring Concentrations

H_2SO_4 - Dec 04, 2014 07:00 to Dec 05, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84* **Print Date:** *12/5/2014 10:30:24 AM*

Manually Logged Real-Time Air Monitoring Concentrations

SO_2 - Dec 04, 2014 07:00 to Dec 05, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84*

Print Date: *12/5/2014 10:29:12 AM*

Manually Logged Real-Time Air Monitoring Concentrations

PM_{10} - Dec 04, 2014 07:00 to Dec 05, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84* **Print Date:** *12/5/2014 10:27:08 AM*

Manually Logged Real-Time Air Monitoring Concentrations

Peroxides - Dec 04, 2014 07:00 to Dec 05, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84*

Print Date: *12/5/2014 10:22:16 AM*

Manually Logged Real-Time Air Monitoring Concentrations

O_2 - Dec 04, 2014 07:00 to Dec 05, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84*

Print Date: *12/5/2014 10:17:18 AM*

Manually Logged Real-Time Air Monitoring Concentrations

LEL - Dec 04, 2014 07:00 to Dec 05, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84*

Print Date: *12/5/2014 10:15:47 AM*

Manually Logged Real-Time Air Monitoring Concentrations

HCl - Dec 04, 2014 07:00 to Dec 05, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84* **Print Date:** *12/5/2014 9:27:41 AM*

Manually Logged Real-Time Air Monitoring Concentrations

H_2S - Dec 04, 2014 07:00 to Dec 05, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

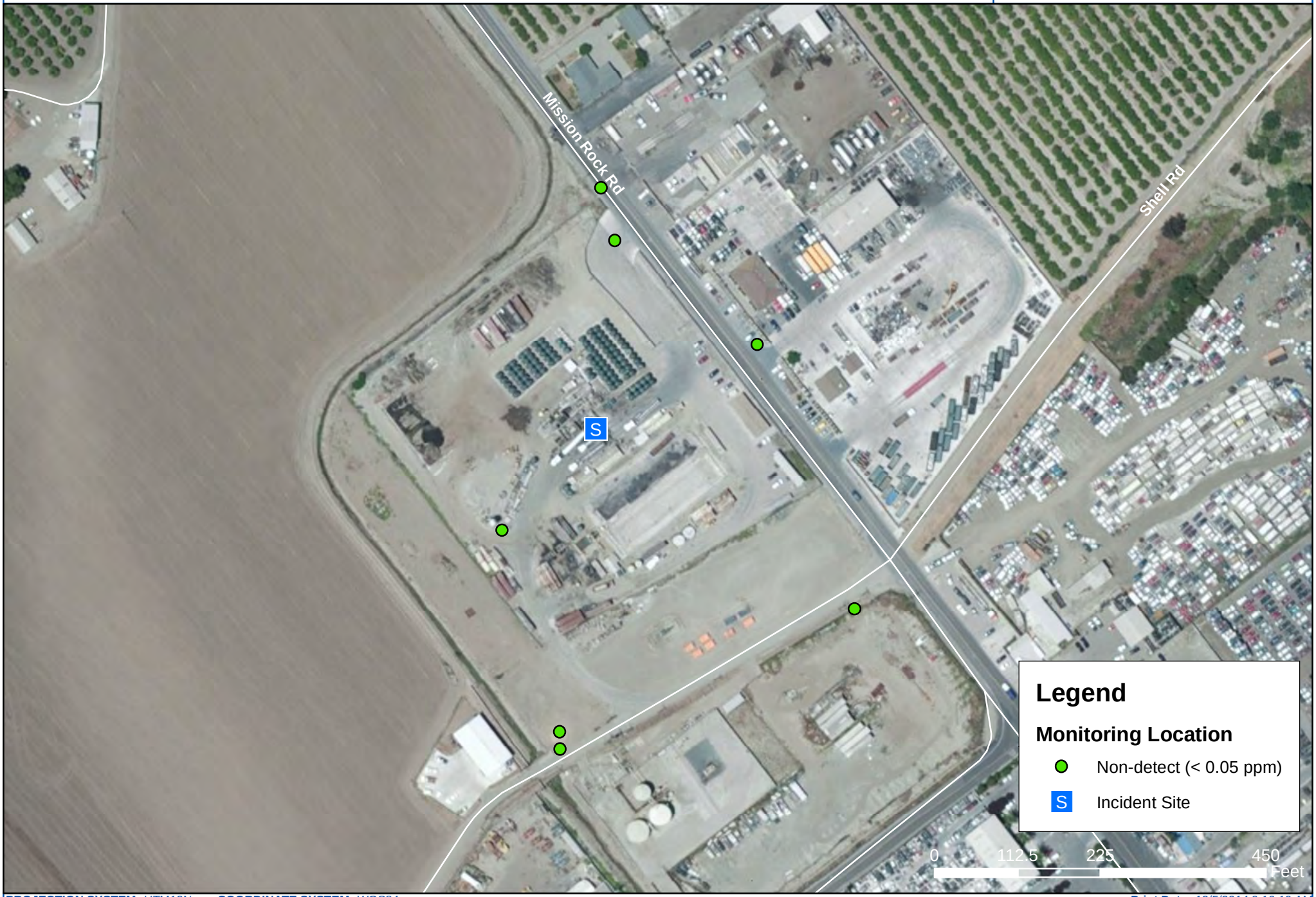
PROJECTION SYSTEM: *UTM13N* COORDINATE SYSTEM: *WGS84*

Print Date: *12/5/2014 9:25:53 AM*

Manually Logged Real-Time Air Monitoring Concentrations

Cl_2 - Dec 04, 2014 07:00 to Dec 05, 2014 07:00

CTEH Project#: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura



PROJECTION SYSTEM: *UTM13N* **COORDINATE SYSTEM:** *WGS84*

Print Date: *12/5/2014 9:16:19 AM*

Appendix B:

AreaRAE Trend Graphs, AM510 Trend Graphs, and AreaRAE/AM510 Air Monitoring Location Map

AreaRAE and AM510 Locations

Mission Incident

Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

PROJECTION SYSTEM: *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *12/4/2014 5:25:42 PM*

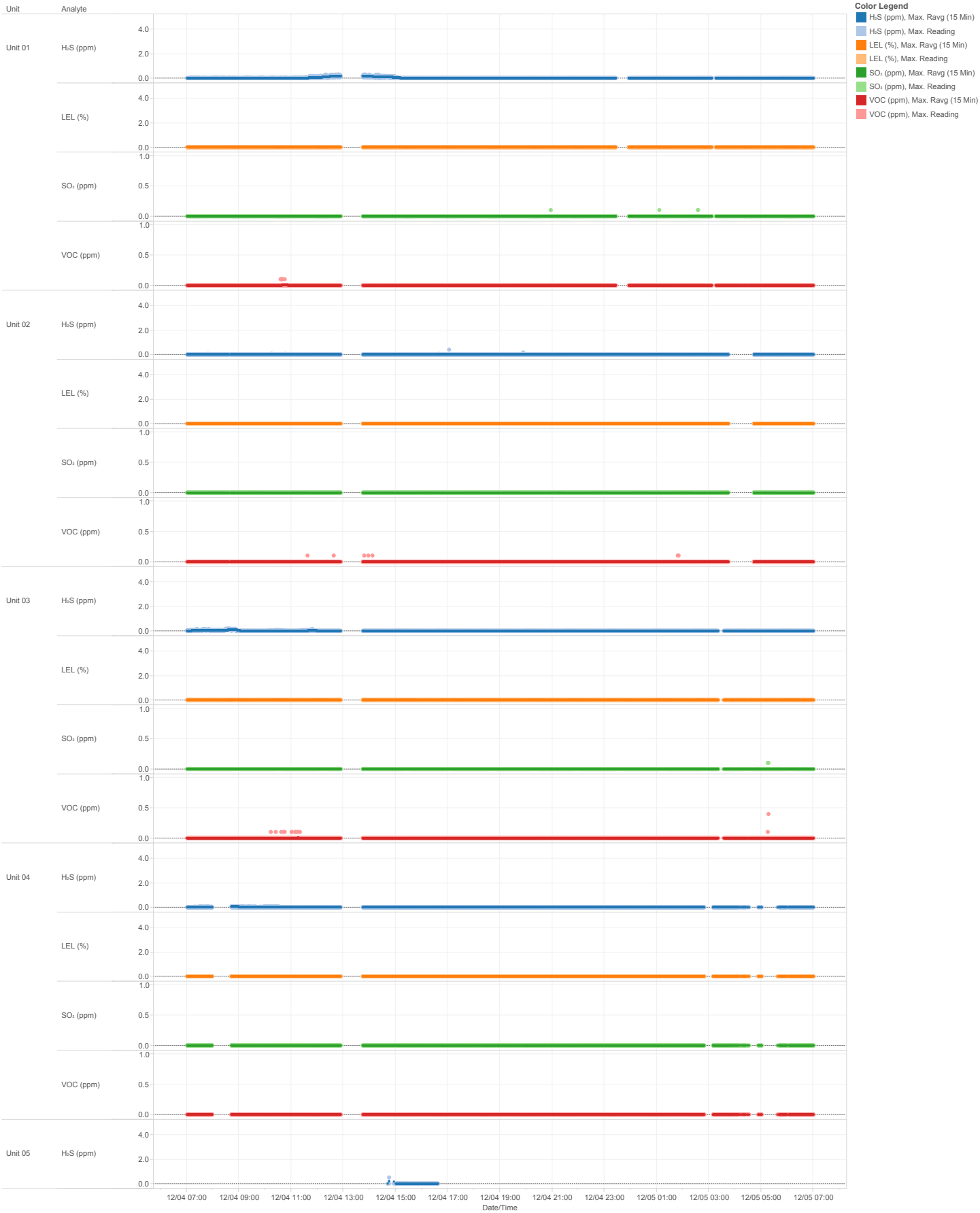
AreaRAE and AM510 Locations

Mission Incident

Project: 106846
Client: Patriot Environmental
City: Santa Paula, CA
County: Ventura

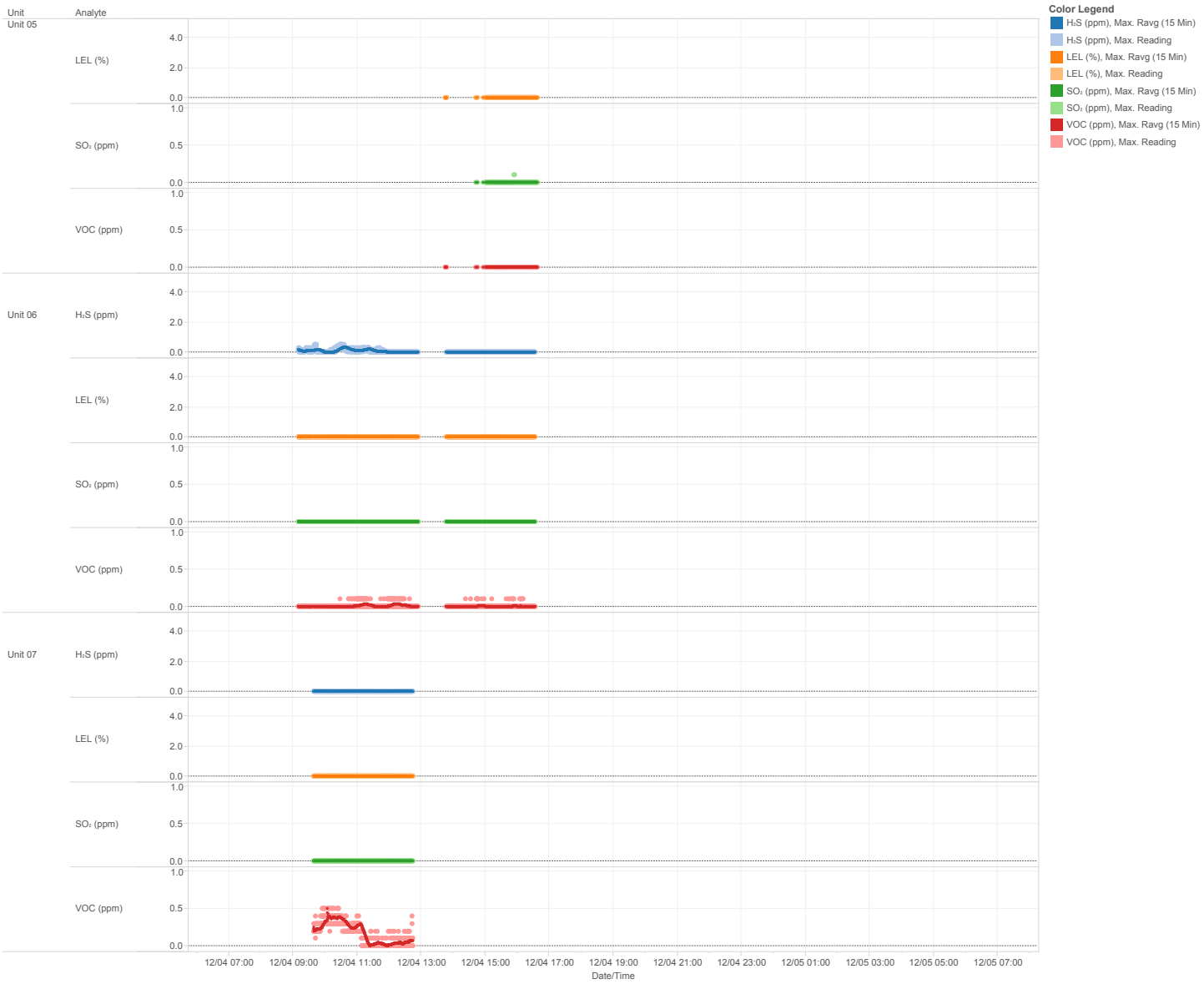
PROJECTION SYSTEM: *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *12/4/2014 5:25:42 PM*

Patriot Environmental
AreaRAE Trend Graphs
12/04/2014 07:00 - 12/05/2014 07:00



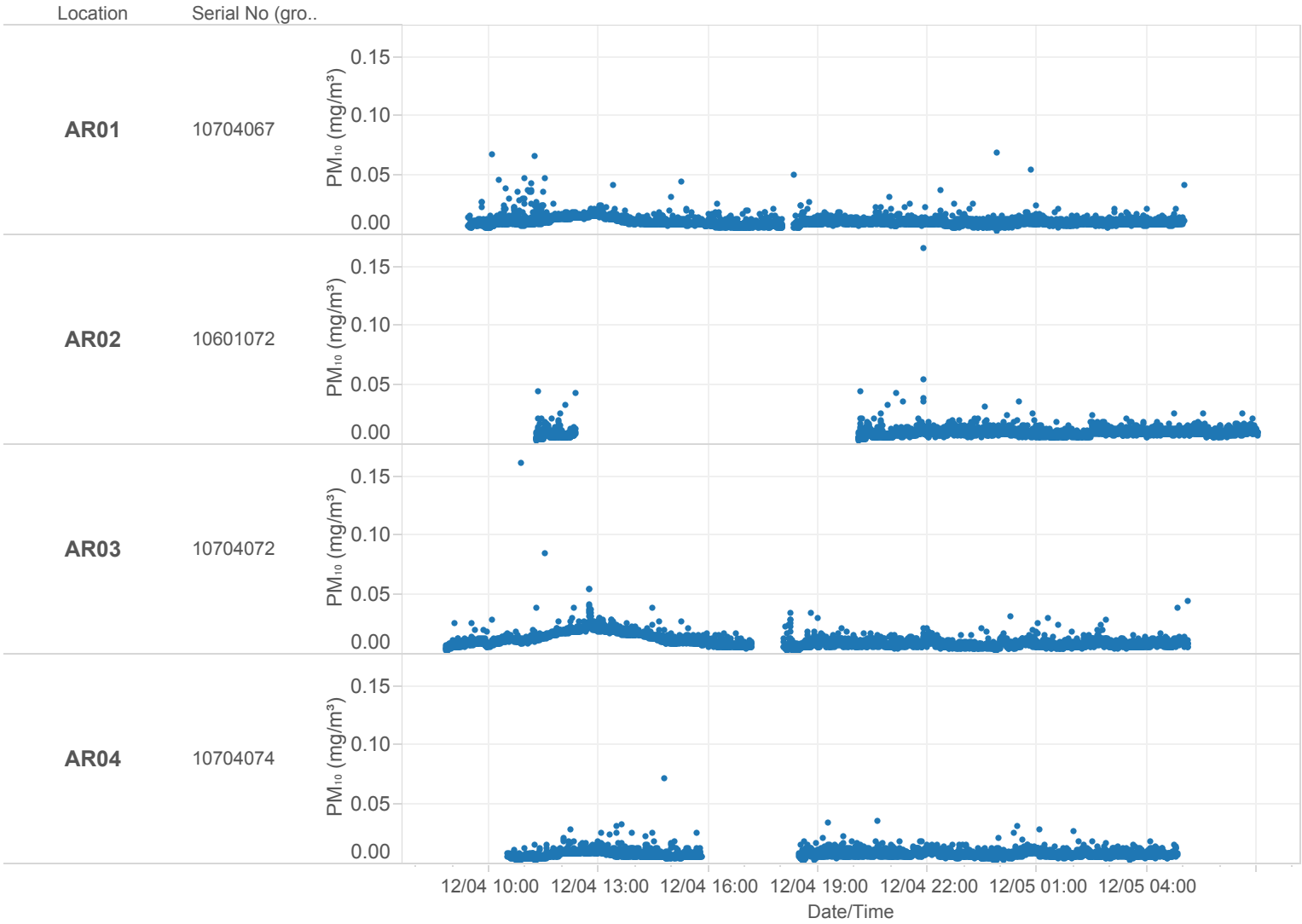
- The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format
- AreaRAE data may contain "drift events." Drift is defined as interference in the electrochemical sensor's ability to accurately report the concentration of a chemical in the atmosphere, resulting in "false positives"

Patriot Environmental
AreaRAE Trend Graphs
12/04/2014 07:00 - 12/05/2014 07:00



- The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format
- AreaRAE data may contain "drift events." Drift is defined as interference in the electrochemical sensor's ability to accurately report the concentration of a chemical in the atmosphere, resulting in "false positives"

Patriot Environmental
MISSION INCIDENT
Datalogged AM510 (PM_{10}) Summary
12/04/2014 07:00 - 12/05/2014 21:30



- The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format